

WHAT IS CLAIMED IS:

1 1. A method of preparing a nucleic acid array on a support, said
2 method comprising synthesizing a plurality of nucleic acids on said support wherein the
3 synthesis steps are carried out in a non-oxidizing atmosphere.

1 2. A method in accordance with claim 1, wherein each nucleic acid
2 occupies a separate predefined region of the support, said synthesizing comprising:

3 (a) activating a region of the support;

4 (b) attaching a nucleotide to a first region, said nucleotide having a
5 masked reactive site linked to a protecting group;

6 (c) repeating steps (a) and (b) on other regions of said support whereby
7 each of said other regions has bound thereto another nucleotide comprising a masked
8 reactive site link to a protecting group, wherein said another nucleotide may be the same
9 or different from that used in step (b);

10 (d) removing the protecting group from one of the nucleotides bound to
11 one of the regions of the support to provide a region bearing a nucleotide having an
12 unmasked reactive site;

13 (e) binding an additional nucleotide to the nucleotide with an unmasked
14 reactive site;

15 (f) repeating steps (d) and (e) on regions of the support until a desired
16 plurality of nucleic acids is synthesized, each nucleic acid occupying separate predefined
17 regions of the support;

18 wherein each of steps (a) through (f) are carried out in a non-oxidizing
19 atmosphere.

1 3. A method in accordance with claim 1, wherein said synthesizing
2 comprises the sequential steps of:

3 a) generating a pattern of light and dark areas by selectively irradiating at
4 least a first area of a surface of a substrate, said surface comprising immobilized
5 nucleotides on said surface, said nucleotides capped with a photoremovable protective
6 group, without irradiating at least a second area of said surface, to remove said protective
7 group from said nucleotides in said first area;

8 b) simultaneously contacting said first area and said second area of said
9 surface with a first nucleotide to couple said first nucleotide to said immobilized

10 nucleotides in said first area, and not in said second area, said first nucleotide capped with
11 said photoremovable protective group;

12 c) generating another pattern of light and dark areas by selectively
13 irradiating with light at least a part of said first area of said surface and at least a part of
14 said second area to remove said protective group in said at least a part of said first area
15 and said at least a part of said second area;

16 d) simultaneously contacting said first area and said second area of said
17 surface with a second nucleotide to couple said second nucleotide to said immobilized
18 nucleotides in at least a part of said first area and at least a part of said second area;

19 e) performing additional irradiating and nucleotide contacting and
20 coupling steps so that a matrix array of at least 100 nucleic acids having different
21 sequences is formed on said support;

22 with the proviso that steps (a) through (e) are performed in said non-oxidizing
23 atmosphere, and said atmosphere has an ozone concentration of from about 0 to about 5
24 ppb.

1 4. A method in accordance with claim 3, wherein said atmosphere is
2 carbon-filtered air.

1 5. A method in accordance with claim 3, wherein said atmosphere is
2 an inert gas.

1 6. A method in accordance with claim 3, wherein said atmosphere is
2 argon.

1 7. A method in accordance with claim 3, wherein said substrate is
2 irradiated with light directed from a source at a position opposite the surface comprising
3 said immobilized nucleotides.

1 8. A method in accordance with claim 3, wherein said substrate is
2 irradiated with light directed from a source on the same side of the surface comprising
3 said immobilized nucleotides.

1 9. A method in accordance with claim 3, wherein said substrate is
2 irradiated with light from a position opposite the surface comprising said immobilized
3 nucleotides and said atmosphere is an inert gas atmosphere.

- 1 **10.** A method of preparing and packaging a nucleic acid array, said
2 method comprising,

3 (a) preparing a nucleic acid array according to the method of claim 1; and

4 (b) packaging said nucleic acid array in an enclosure having a non-
5 oxidizing atmosphere.

1 **11.** A method in accordance with claim 10, wherein each of said steps
2 is conducted in a facility having an atmosphere comprising 5 ppb or less ozone.

1 **12.** A method in accordance with claim 10, wherein for the period of
2 time between said preparing and packaging steps, said nucleic acid array is exposed to
3 unfiltered air for a period of 2 hours or less.

1 **13.** A method of preparing a nucleic acid array, said method
2 comprising attaching each of a plurality of nucleic acids to a solid support at preselected
3 locations to provide said array, wherein said attaching is carried out in a non-oxidizing
4 atmosphere.

1 **14.** A method in accordance with claim 13, said atmosphere
2 comprising ozone at a concentration of from about 0 to 5 ppb.

1 **15.** A method in accordance with claim 2, wherein each of said nucleic
2 acids comprise from 5 to 30 nucleotide residues.

1 **16.** A nucleic acid array prepared by the method of claim 1.

1 **17.** A nucleic acid array prepared and packaged by the method of claim
2 **10.**